

## RESONANT CONTROLLED QUBIT SYSTEM

### ABSTRACT

5           A circuit comprising a superconducting qubit and a resonant control system that is  
characterized by a resonant frequency. The resonant frequency of the control system is a  
function of a bias current. The circuit further includes a superconducting mechanism  
having a capacitance or inductance. The superconducting mechanism coherently couples  
the superconducting qubit to the resonant control system. A method for entangling a  
10   quantum state of a first qubit with the quantum state of a second qubit. In the method, a  
resonant control system, which is capacitively coupled to the first and second qubit, is  
tuned to a first frequency that corresponds to the energy differential between the lowest  
two potential energy levels of the first qubit. The resonant control system is then adjusted  
to a second frequency corresponding to energy differential between the lowest two  
15   potential energy levels of the second qubit.